

In the Claims

Please cancel claim 71 and amend claims 56, 64, 69, 84 and 86 as follows:

56. (Amended) A substrate for analyzing a nucleic acid, the substrate comprising:
B2
a cavitated fiber optic wafer formed from a fused bundle of a plurality of individual optical fibers, each individual optical fiber having a diameter between 3 and 100 μm , the wafer comprising a top surface and a bottom surface, the top surface comprising at least 10,000 wells, wherein said wells are etched into the top surface of the cavitated fiber optic wafer and wherein the thickness of the wafer between the top surface and the bottom surface is between 0.5 mm and 5.0 mm in thickness; and wherein the depth of each well ranges from between one half the diameter of an individual optical fiber to three times the diameter of an individual optical fiber;
a plurality of beads within the cavitated wafer, wherein each bead has a pyrophosphate sequencing reagent attached thereto.

B3
64. (Amended) The substrate of claim 56 wherein the wafer further comprises 10^3 or more groups of oligonucleotides in said wells.

B4
69. (Amended) An array of more than 1,000 different groups of oligonucleotide molecules, a cavitated fiber optic wafer formed from a fused bundle of a plurality of individual optical fibers, each individual optical fiber having a diameter between 3 and 100 μm , the wafer comprising a top surface and a bottom surface, the top surface comprising at least 10,000 wells, wherein said wells are etched into the top surface of the cavitated fiber optic wafer and wherein the thickness of the wafer between the top surface and the bottom surface is between 0.5 mm and 5.0 mm in thickness; and wherein the depth of each well ranges from between one half the diameter of an individual optical fiber to three times the diameter of an individual optical fiber.

B5
84. (Amended) An apparatus for processing a plurality of nucleic acids, the apparatus comprising:

BS C&H

a flow chamber having disposed therein a cavitated fiber optic wafer surface
a cavitated fiber optic wafer formed from a fused bundle of a plurality of individual optical fibers, each individual optical fiber having a diameter between 3 and 100 μm , the wafer comprising a top surface and a bottom surface, the top surface comprising at least 10,000 wells, wherein said wells are etched into the top surface of the cavitated fiber optic wafer and wherein the thickness of the wafer between the top surface and the bottom surface is between 0.5 mm and 5.0 mm in thickness; and wherein the depth of each well ranges from between one half the diameter of an individual optical fiber to three times the diameter of an individual optical fiber;

a plurality of beads within the cavitated wafer, wherein each bead has a pyrophosphate sequencing reagent attached thereto;

fluid means for delivering pyrosequencing reagents from one or more reservoirs to the flow chamber so nucleic acids disposed in the wells of the fiber optic wafer are exposed to the reagents; and

detection means for detecting optical signals from each well, wherein said detection means is in communication with the wells, each optical signal being indicative of reaction of the pyrosequencing reagents with the nucleic acid in a well.

BS 86. (Amended) The apparatus of claim 85, wherein said detection means is a CCD camera.

C Please add the following new claims 88-99. *J*

88. (New) The substrate of claim 56 wherein the substrate has a polished fiber optic surface opposite to the cavitated fiber optic surface.

BS 89. (New) The substrate of claim 88 wherein the polished surface allows for optical coupling to a second optical fiber.

90. (New) The substrate of claim 56 wherein the cavitated surface is coated.

37
cont.

91. (New) The substrate of claim 90 wherein the coating is selected from the group consisting of plastic, gold layers, organosilane reagents, photoreactive linkers, hydrophilic polymer gels and pluronic polymers.
92. (New) The substrate of claim 56 wherein said sequencing reagent is luciferase.
93. (New) The substrate of claim 56 wherein said sequencing reagent is sulfurylase.
94. (New) The array of claim 69 wherein the wafer has a polished fiber optic surface opposite to the cavitated surface.
95. (New) The array of claim 94 wherein the polished surface allows for optical coupling to a second optical fiber.
96. (New) The array of claim 69 wherein the cavitated surface is coated.
97. (New) The array of claim 96 wherein the coating is selected from the group consisting of plastic, gold layers, organosilane reagents, photoreactive linkers, hydrophilic polymer gels and pluronic polymers.
98. (New) The array of claim 69 wherein said sequencing reagent is luciferase.
99. (New) The array of claim 69 wherein said sequencing reagent is sulfurylase.
